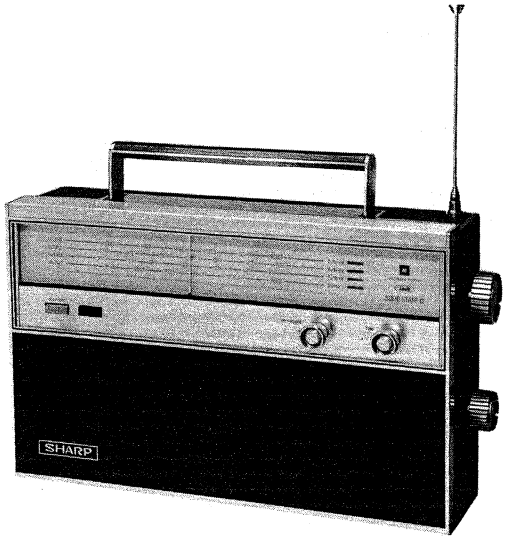
SHARP Service Manual



MODEL

FW-507

SPECIFICATIONS

Frequency Range

AM	530 ~ 1650 kHz
MB	1.6 ~ 4.3 MHz
SW	3.9 ~ 12 MHz
FM	88 ~ 108 MHz

Intermediate Frequency

AM	455 kHz
FM	10.7 MHz

Power Supply ..... DC 6V (UM-2×4)
AC 120V 60Hz

Power Output

Undistorted	500mW
Maximum	800mW

Speaker ..... 13cm×9cm Voice Coil
Impedance 8 ohm

Dimensions ..... 28.5cm (W)×18.5cm (H)×
7.5cm (D)

Transistor Complement

Q1	2SC461 (B)	FM RF Amplifier
Q2	2SA235(C)	FM Converter
Q3	2SA 12(C)	AFC
Q4	2SA351(B)	AM Oscillator
Q5	2SA352(B)	1st FM IF Amplifier & AM Mixer
Q6	2SA234(C)	2nd FM IF Amplifier & 1st AM IF Amplifier
Q7	2SA234(B)	3rd FM IF Amplifier & 2nd AM IF Amplifier
Q8	2SB 75(B)	Audio Amplifier
Q9	2SB77(B)	Audio Driver
Q10, Q11	2SB77(B)	Output (Matched Pair)
Q12	2SB156(B)	AC Power Stabilizer

GENERAL DESCRIPTION

The circuit used in this 4 band portable radio incorporates 12 transistors, 5 diodes, 2 rectifiers and I thermistor.

A ferrite bar antenna feeds the AM signal to the AM mixer a telescopic rod antenna feeds the AM signal to the AM mixer and two 1F amplifiers and a diode detector.

A telescopic rod antenna feeds the FM signal to the FM RF amplifier, FM converter, 3 IF amplifiers and two diodes FM detector.

Audio signal passes through the 4 transistors audio amplifier circuit.

An AM AVC voltage is fed back to the 1st IF amplifier.

A FM AVC voltage is fed back to the FM RF amplifier.

An AFC voltage is fed back to the FM converter (oscillator).

SHARP CORPORATION OSAKA, JAPAN

CHASSIS REMOVAL (Refer to Figure 1)

1. Pull off the 4 control knobs ② located on the front and side of the cabinet.
2. Remove the battery cover and batteries.
3. Remove the rod antenna retaining screw ⑤ and disconnect the rod antenna lead.
4. Remove the 5 screws ① retaining the cabinet.
5. Detach the dial cord from the pointer.
6. Remove the 4 screws ③ retaining the chassis and remove the 1 screw ④ retaining the AFC switch.
7. Pull the chassis out of the cabinet.

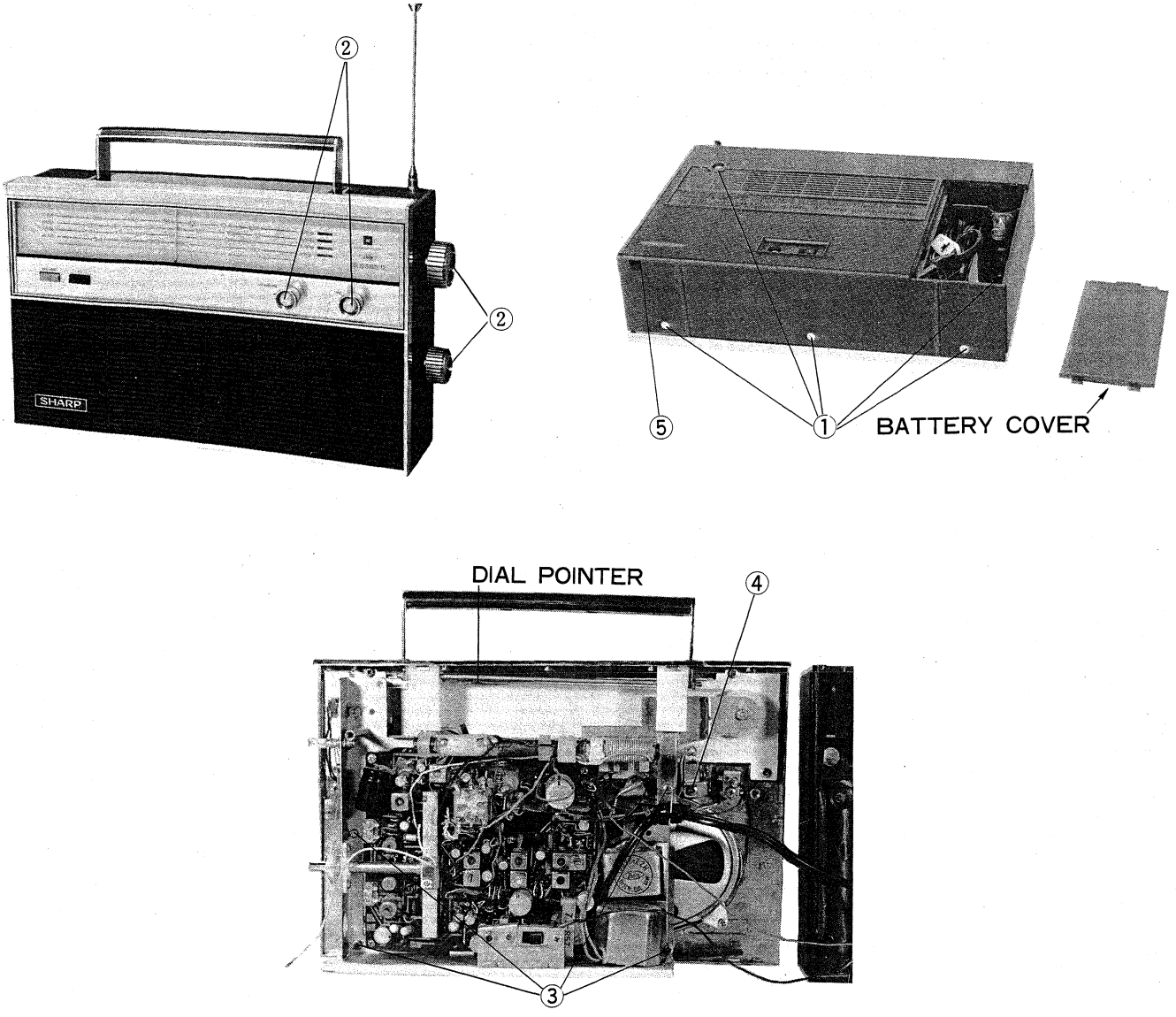


Figure 1

ALIGNMENT INSTRUCTIONS

Should it become necessary at any time to check the alignment of this receiver, proceed as follows.

(1) Connect an output meter across the speaker voice coil lugs.
(2) Set the volume control for maximum.
(3) Attenuate the signals from generator enough to swing the most sensitive range of output meter.
(4) Use a non-metallic alignment tool.
(5) Repeat adjustments to insure good results.

AM ALIGNMENT CHART

Signal Generator				Receiver		Adjustment
Step	Band	Connection to receiver	Input signal frequency	Dial setting	Remarks	
1	AM	Connect signal generator through a 10K ohm dummy to the antenna tuning condenser. Connect ground lead of generator to the receiver chassis.	Exactly 455kHz (400Hz, 30%, AM modulated)	Tuning gang fully open. (minimum capacity)	Adjust for maximum output on speaker voice coil lugs.	T7 T5 T3
2	AM	Use radiating loop. Loop of several turns of wire, or place generator lead close to receiver for adequate signal pickup. Connect generator output to one end of radiating loop.	Exactly 600kHz (400Hz, 30%, AM modulated)	600kHz.	Same as step 1.	L11 & L8 (See NOTE A.)
3	AM	Same as step 2.	Exactly 1200kHz (400Hz, 30%, AM modulated)	1200kHz	Same as step 1.	C108 & C105 (See NOTE A.)
4		Repeat steps 2 and 3 until no further improvement can be made.				
5	MB	Same as step 2.	Exactly 1.8MHz (400Hz, 30%, AM modulated)	1.8MHz.	Same as step 1.	L10 & L7 (See NOTE A.)
6	MB	Same as step 2.	Exactly 3.8MHz (400Hz, 30%, AM modulated)	3.8MHz.	Same as step 1.	C109 & C106 (See NOTE A.)
7		Repeat steps 5 and 6 until no further improvement can be made.				
8	SW	Same as step 2.	Exactly 4.3MHz (400Hz, 30%, AM modulated)	4.3MHz.	Same as step 1.	L9 & L6
9	SW	Same as step 2.	Exactly 10MHz (400Hz, 30%, AM modulated)	10MHz.	Same as step 1.	C110 & C107
10		Repeat steps 8 and 9 until no further improvement can be made.				

Note:

A) Check the alignment of the receiver antenna coil by bringing a piece of ferrite near the antenna loop stick, then a piece of brass. If ferrite increases output, loop requires more inductance. If brass increases output, loop requires less inductance. Change loop inductance by sliding the bobbin toward the center of ferrite core to increase inductance, or away to decrease inductance.

FM ALIGNMENT CHART

Signal Generator				Receiver		Adjustment
Step	Band	Connect to receiver	Input signal frequency	Dial setting	Remarks	
1	FM	Connect signal generator through a 5PF dummy to converter emitter, TP 1. Connect generator ground lead to the receiver chassis.	Exactly 10.7MHz (400Hz, 30%, AM modulated)	Tuning gang fully closed. (maximum capacity)	Connect VTVM between TP 2 and chassis ground.	Tune T1, T2, and T4 for maximum indication. Detune T6A & T6B
2	FM	Same as step 1.	Exactly 10.7MHz (Unmodulated)	Same as step 1.	Same as step 1. (See NOTE B.)	(See NOTE B.)
3	FM	Connect signal generator through a 75 ohm including output impedance of signal generator to the external antenna coil lug. Ground lead to the receiver chassis.	Exactly 88MHz (400Hz, 30%, FM modulated)	88MHz	Adjust for maximum output speaker voice coil lugs.	L5 & L3
4	FM	Same as step 3.	Exactly 108MHz (400Hz, 30%, FM modulated)	108MHz	Same as step 3.	C112 & C111
5	Repeat steps 3 and 4 until no further improvement can be made.					

NOTE: B) 1. Connect VTVM (0.1 volts range D.C. scale) between test point TP4 and chassis ground.
2. Adjust T6B for 0 volt reading on VTVM.
3. Change signal generator frequency 10.7MHz + 100kHz and −100kHz approximately.
4. Adjust T6A for balanced peaks. Peak separation should be approximately 200kHz.

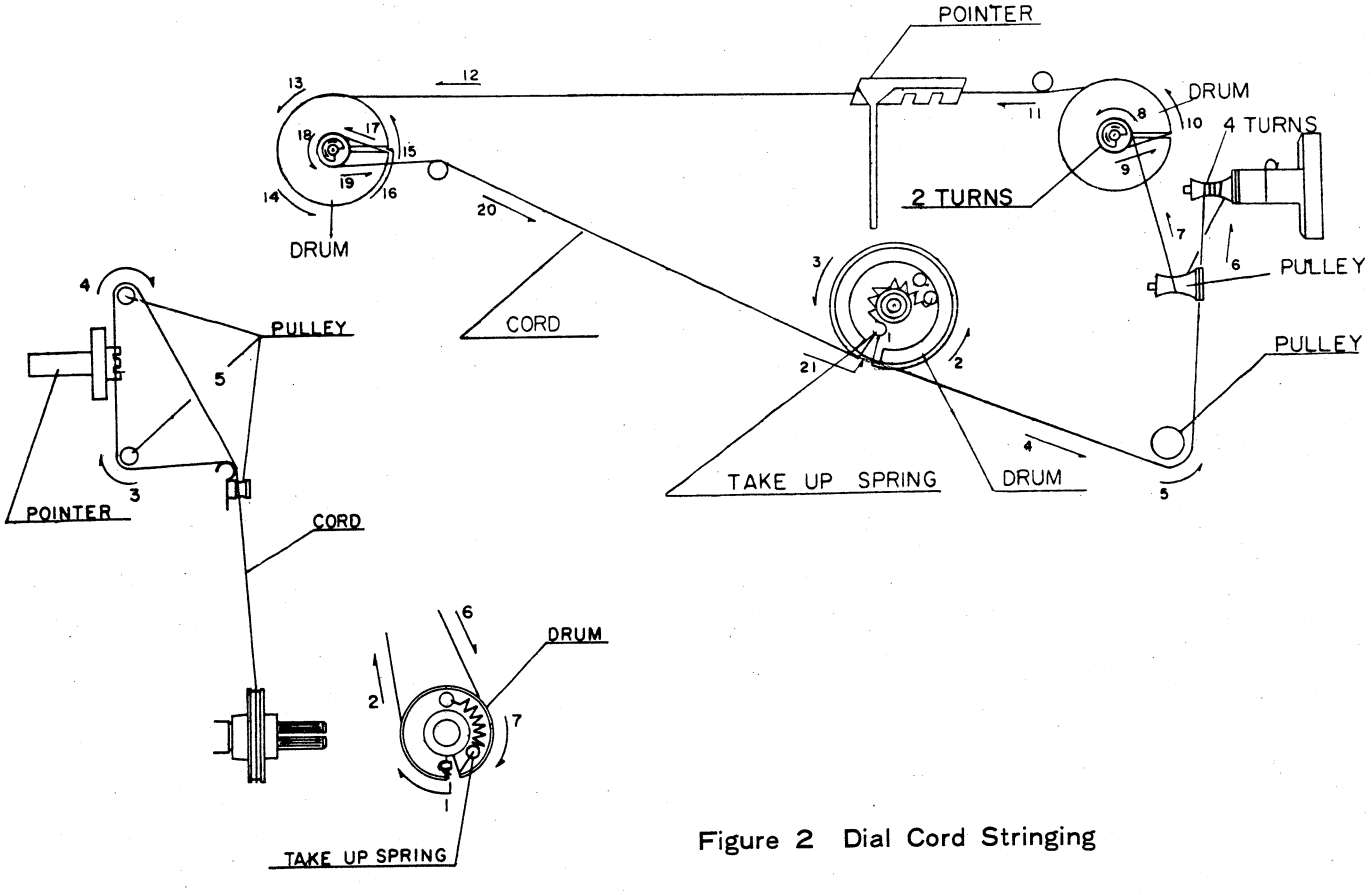


Figure 2 Dial Cord Stringing

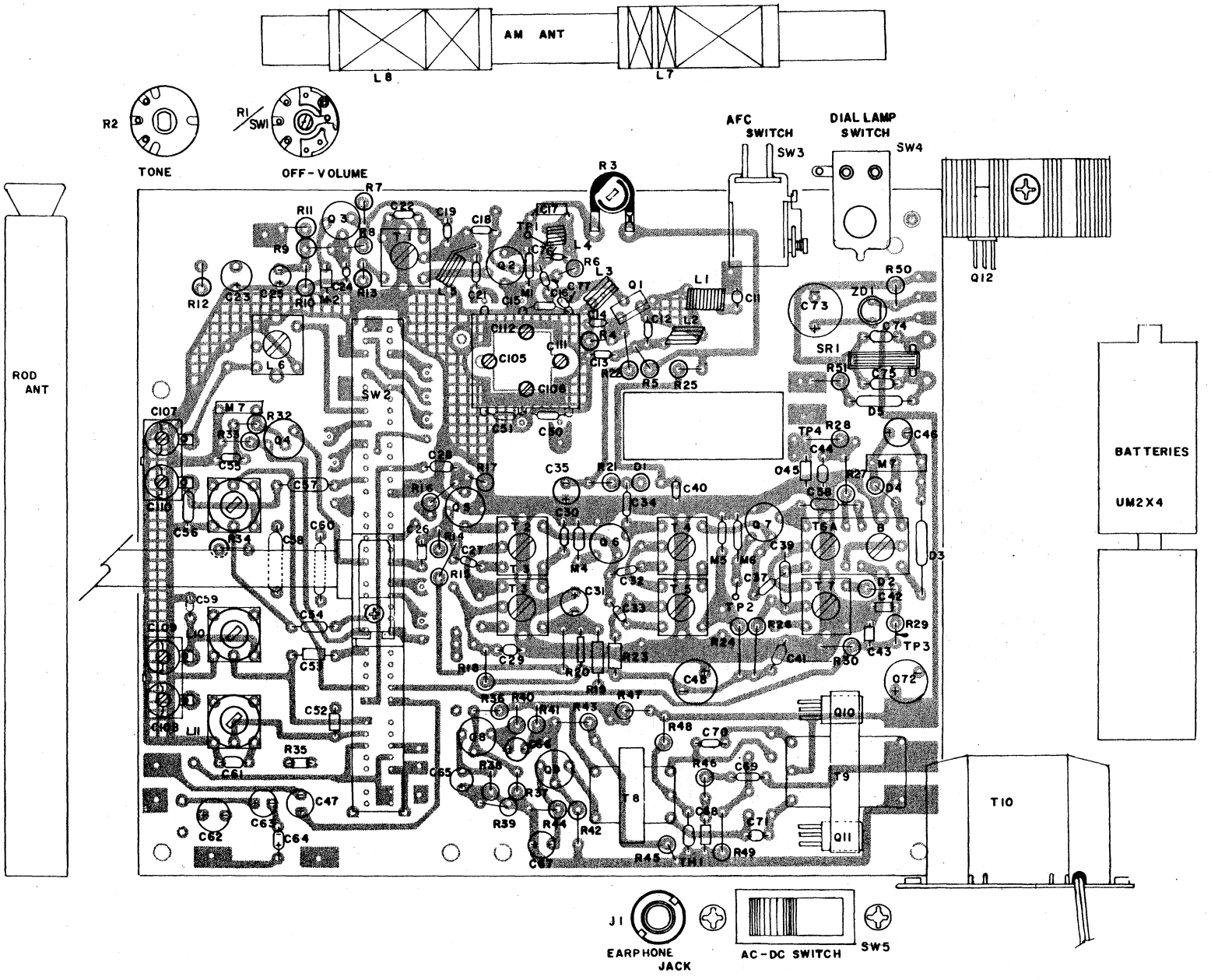


Figure 3 Component Side of P.C. Board

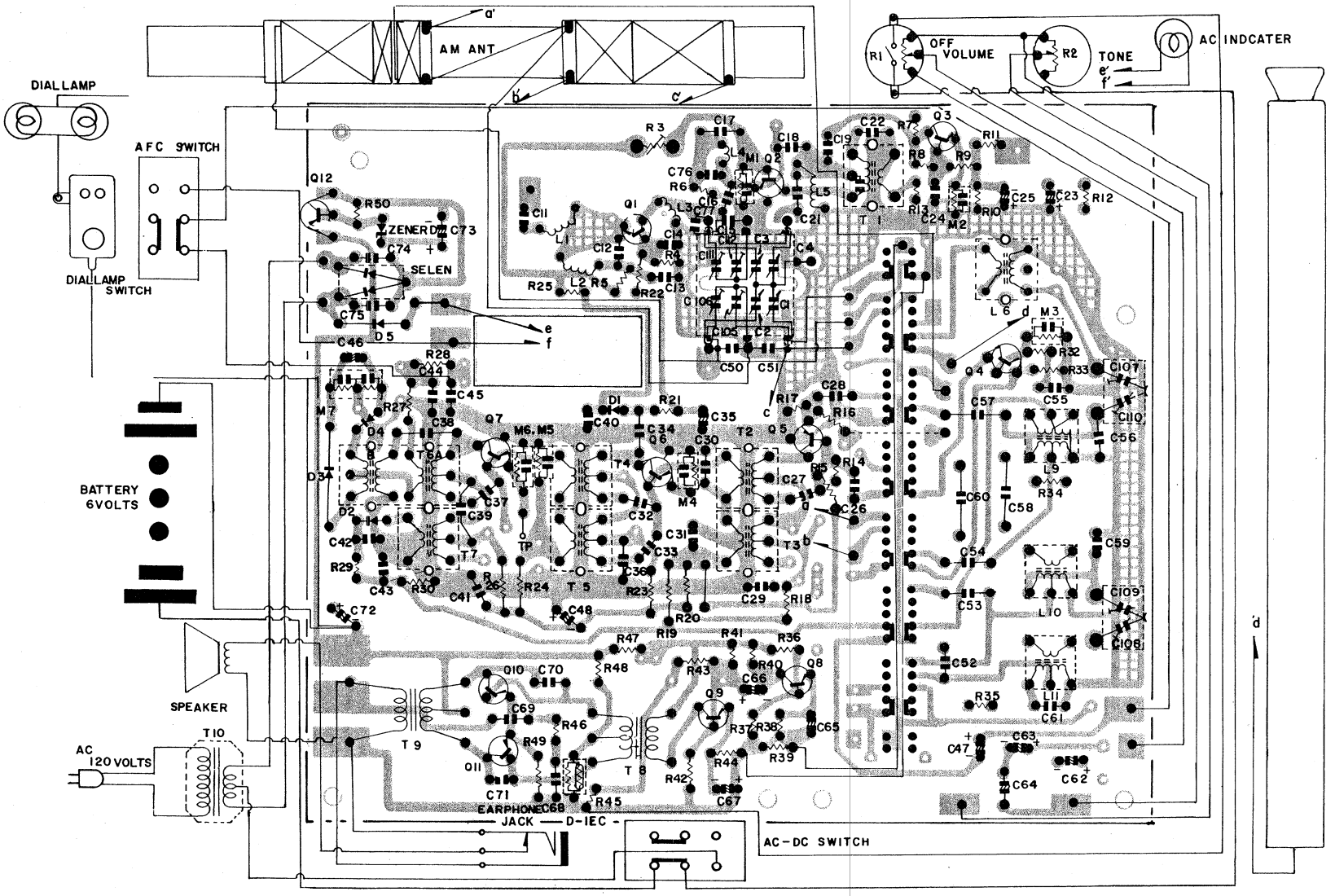


Figure 4 Wiring Side of P.C. Board

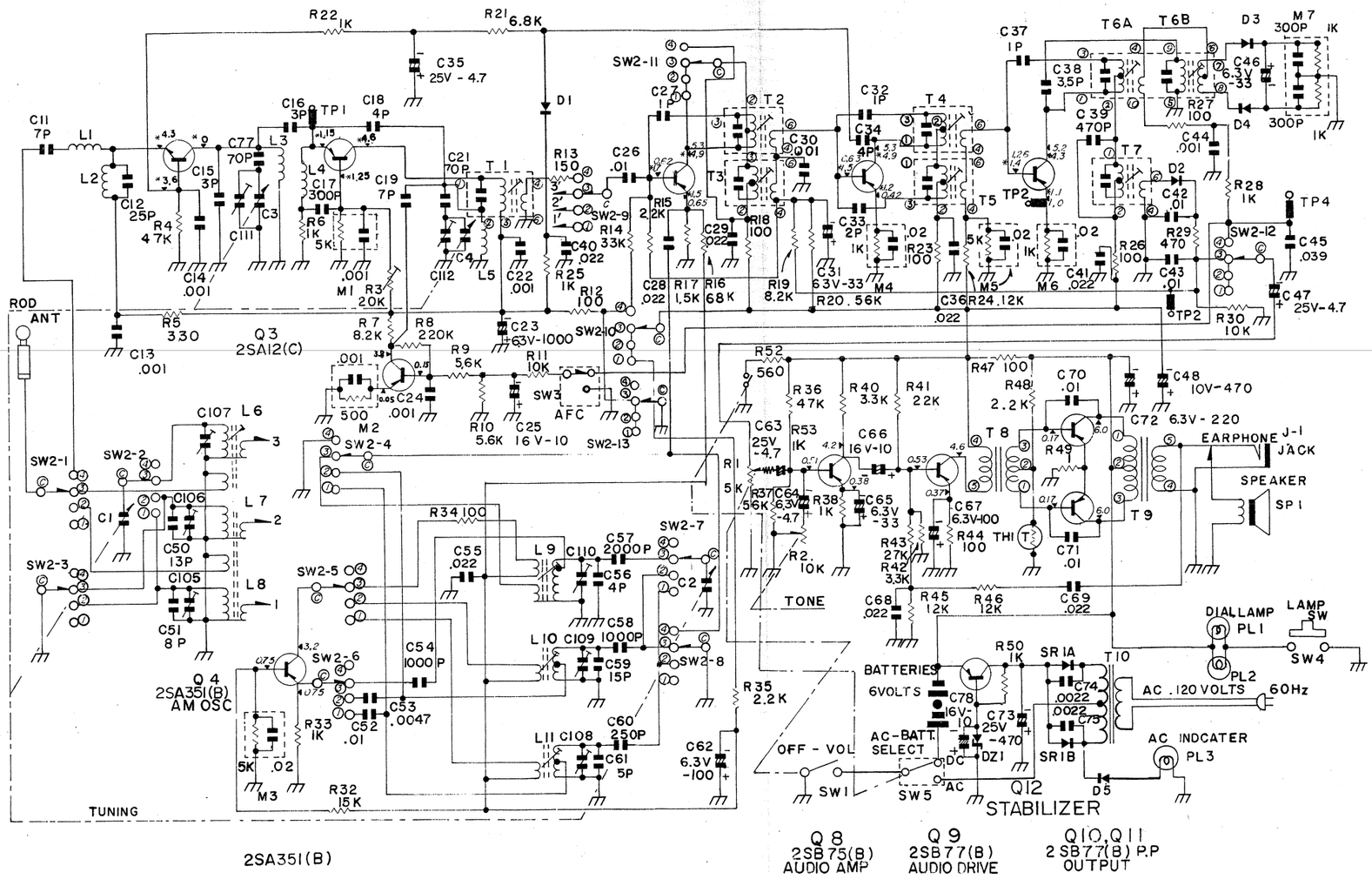
Q 1
2SC461(B)
FM RF AMP

Q 2
2SA235(C)
FM CONV

Q 5
2SA352(B)
IST FM IF
AM MIX

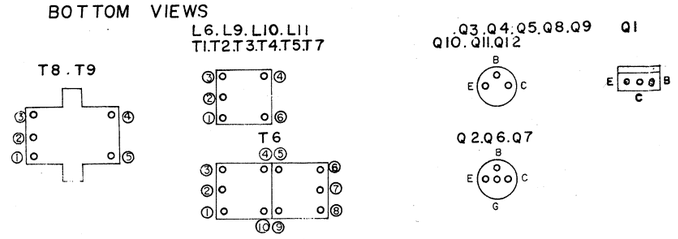
Q 6
2SA234(C)
2ND FM IF
IST AM IF

Q 7
2SA234(B)
3RD FM IF
2ND AM IF



2SA351(B)

BOTTOM VIEWS



NOTE
1. BAND SELECTOR SWITCH SW2-1～12 IN SW POSITION
   CAPACITANCE VALUES ARE IN MFD , P= MMF RESISTANCE
   VALUES ARE IN OHMS , K=1000
2. FREQ RANGE FM 88 – 108MHz SW 3.9 – 12MHz
   MB1.6 – 4.3MHz AM 530 – 1650kHz
3. IF FM. 10.7MHz AM 455kHz
4. VOLTAGE READINGS TO COMMON GROUND(+) ARE MEASURED WITH V.T.V.M UNDER NO SIGNAL CONDITIONS
   VOLTAGE MARKED WITH ✳ ARE MEASURED IN FM POSITION

Figure 5 Schenatic Diagram

PARTS LIST

REF.NO.	PART NO.	DESCRIPTION

RESISTORS

R1/SW1	1548274800	5K ohm, Pot., Off-On/Volume Control	(8V-748)
R2	1548278800	10K ohm, Pot., Tone	(8V-788)
R3	1548277500	20K ohm, Pot., AFC	(8V-775)
R4, R36	1545247321	47K ohm	(¼SU-47KK)
R5	1545233121	330 ohm	(¼SU-330K)
R6, R22, R25, R33, R38, R50, R53	1545210221	1K ohm	(¼SU-1KK)
R7, R19	1545282221	8.2K ohm	(¼SU-8.2KK)
R8	1545222421	220K ohm	(¼SU-220KK)
R9, R10, R37	1545256221	5.6K ohm	(¼SU-5.6KK)
R11, R30,	1545210321	10K ohm	(¼SU-10KK)
R12, R18, R23, R26, R27, R34, R44	1545210121	100 ohm	(¼SU-100K)
R13	1545215121	150 ohm	(¼SU-150K)
R14	1545233321	33K ohm	(¼SU-33KK)
R15, R35, R48	1545222221	2.2K ohm	(¼SU-2.2KK)
R16	1545268321	68K ohm	(¼SU-68KK)
R17	1545215221	1.5K ohm	(¼SU-1.5KK)
R20	1545256321	56K ohm	(¼SU-56KK)
R21	1545268221	6.8K ohm	(¼SU6.8KK)
R24, R45, R46	1545212321	12K ohm	(¼SU-12KK)
R28	1544210221	1K ohm	(¼SA-1KK)
R29	1544247121	470 ohm	(¼SA-470K)
R32	1545215321	15K ohm	(¼SU-15KK)
R40, R42	1545233221	3.3K ohm	(¼SU-3.3KK)
R41	1545222321	22K ohm	(¼SU-22KK)
R43	1545227321	27K ohm	(¼SU-27KK)
R47	1544210121	100 ohm	(¼SA-100K)
R49	1545293900	1 ohm	(¼SU-1K)
R52	1544256121	560 ohm	(¼SA-560K)

(Unless otherwise specified resistors are ¼W, 10%, carbon type.)

CAPACITORS

C1, C2, C3, C4	1560243500	Variable, Tuning Gang with Trimmers	(VC-435)
C105,C106, C107,C108, C109,C110, C111,C112	1560270100	Trimmer	(TO-701)
C11, C19,	1552270927	7 PF, 50V, .5PF, Discap	(D-5-709D)
C12	1552225817	25PF, 50V, 5%, Discap	(D-5-258J)
C13, C14, C22, C24, C44	1552612700	.001MFD, 50V, Discap	(D-5-106Z)
C15, C16	1552230917	3PF, 50V, .25PF, Discap	(D-5-309C)
C17	1552330717	300PF, 50V, 5%, Discap	(DS-5-307J)
C18, C34, C56	1552240917	4PF, 50V, .25PF, Discap	(D-5-409C)
C21	1568241000	70PF, 50V, 5%, Discap	(DCH-5-708J)
C23	1661210011	1,000MFD, 10V, Electrolytic	(CU-1-100Q)
C25, C66, C78	1661210213	10MFD, 16V, Electrolytic	(CU1.6-102Q)
C26, C42, C43, C52, C70, C71	1552210537	.01 MFD, 50V, 20%, Discap	(D-5-105M)
C27, C32, C37	1552210917	1PF, 50V, .25PF, Discap	(D-5-109C)
C28, C68, C69	1552222537	.022MFD, 50V, 20%, Discap	(D-5-225M)
C29, C36, C40, C41, C55	1552614700	.022MFD, 50V, Discap	(D-5-225Z)
C30, C54	1552210637	.001 MFD, 50V, 20%, Discap	(D-5-106M)
C31, C46, C65	1661233211	33 MFD, 6.3V, Electrolytic	(CU-06-332Q)
C33	1552220917	2PF, 50V, .25PF, Discap	(D-5-209C)
C35, C47, C63	1661247325	4.7MFD, 25V, Electrolytic	(CU-2.5-473R)
C38	1552235917	3.5PF, 50V, .25PF, Discap	(D-5-359C)
C39	1552347727	470PF, 50V, 5%, Discap	(DS-5-477J)
C45	1556239537	.039 MFD, 50V, 20%, Mylar	(ML-5-395M)
C48	1661247112	470MFD, 10V, Electrolytic	(CU-1-471Q)
C50	1552213817	13PF, 50V, 5%, Discap	(D-5-138J)
C51	1552280937	8PF, 50V, 1PF, Discap	(D-5-809F)
C53	1552247637	.0047MFD, 50V, 20%, Discap	(D-5-476M)
C57	1558220617	.002 MFD, 50V, 5%, Styrol	(S-5-206J)
C58	1558210617	.001 MFD, 50V, 5%, Styrol	(S-5-106J)
C59	1552215817	15PF, 50V, 5%, Discap	(D-5-158J)
C60	1552325717	250PF, 50V, 5%, Discap	(DS-5-257J)
C61	1552250917	5PF, 50V, .25PF, Discap	(D-5-509C)
C62, C67	1661210111	100MFD,6.3V, Electrolytic	(CU-06-101Q)
C64	1658347411	.47MFD, 6.3V, 20%, Electrolytic	(AD-06-474M)
C72	1661222111	220MFD, 6.3V, Electrolytic	(CU-06-221Q)
C73	1661247115	470MFD, 25V, Electrolytic	(CU-2.5-471Q)
C74, C75	1552613300	.0022MFD, 50V, Discap	(D-5-226Z)
C77	1552370817	70PF, 50V, 5%, Discap	(DS-5-708J)

PACKAGED CIRCUITS

M1	1656632400	Capristor, 5K ohm + .001MFD	(PRC-324)
M2	1656632500	Capristor, 500 ohm + .001MFD	(PRC-325)
M3, M5	1656631500	Capristor, 5K ohm + .02MFD	(PRC-315)
M4, M6	1656633200	Capristor, 1K ohm + .02MFD	(PRC-332)
M7	1559233300	Capristor, 1K ohm + 300PF x 2	(PRC-333)

SEMICONDUCTORS

Q1	1527210721	Transistor, FM RF Amp.	(2SC461 Ⓑ)
Q2	1522214435	Transistor, FM Converter	(2SA235 Ⓒ)
Q3	1522210131	Transistor, FM AFC	(2SA12 Ⓒ)
Q4	1522210921	Transistor, AM Oscillator	(2SA351 Ⓑ)
Q5	1522211021	Transistor, 1st FM IF Amp. & AM Mixer	(2SA352 Ⓑ)
Q6	1522214831	Transistor, 2nd FM IF & 1st AM IF Amp.	(2SA234 Ⓒ)
Q7	1522214821	Transistor, 3rd FM IF & 2nd AM IF Amp.	(2SA234 Ⓑ)
Q8	1522211221	Transistor, Audio Amp.	(2SB75 Ⓑ)
Q9	1522211321	Transistor, Audio Driver	(2SB77 Ⓑ)
Q10, Q11	1522211328	Transistor, Output (Matched Pair)	(2SB77 Ⓑ)
Q12	1522213921	Transistor, AC Power Stabilizer	(2SB156 Ⓑ)

PARTS LIST

REF.NO.	PART NO.	DESCRIPTION

D1	1522270201	Diode, FM AVC	(1N60)
D2	1522270101	Diode, AM Detector	(1N34A)
D3, D4	1522270208	Diode, FM Detector (Matched Pair)	(1N60)
D5	1522270101	Diode, Rectifier	(1N34A)
TH-1	1522280931	Thermistor, AOC	(D-1E Ⓒ)
SRIA, B	1523270105	Rectifier, Power	(SELEN-701)
ZD1	1527271301	Regulator, Power	(1S-1715)

COILS

L1	1507260400	Coil, FM Antenna	(7L-604C)
L2	1507259700	Coil, FM Antenna	(7L-597C)
L3	1507261900	Coil, FM RF	(7L-619C)
L4	1507295400	Coil, FM Emitter Choke	(7L-954)
L5	1507259700	Coil, FM Oscillator	(7L-597C)
L6	1508221500	Coil, SW Antenna	(8L-215A)
L7, L8	1508221401	Coil, AM, MB Antenna	(8L-214AO1)
L9	1507202900	Coil, SW Oscillator	(7L-029B)
L10	1508230200	Coil, MB Oscillator	(8L-302B)
L11	1507203400	Coil, AM Oscillator	(7L-034B)

TRANSFORMERS

T1	1507273500	Transformer, 1st FM IF	(7IF-735)
T2	1507274500	Transformer, 2nd FM IF	(7IF-745)
T3	1507274300	Transformer, 1st AM IF	(7IF-743)
T4	1507274500	Transformer, 3rd FM IF	(7IF-745)
T5	1507276500	Transformer, 2nd AM IF	(7IF-765)
T6	1507273900	Transformer, FM Detector	(7IF-739)
T7	1507273400	Transformer, AM Detector	(7IF-734)
T8	1516280100	Transformer, Input	(6T-801)
T9	1517285700	Transformer, Output	(7T-857)
T10	1515276000	Transformer, Power	(5T-760)

MISCELLANEOUS

	11032341	Cabinet	(3CAB-4168)
	11062829	Panel	(PANEL-4168)
	11092403	Knob, Tuning	(9K-403)
	11092404	Knob, Band Selector Switch	(9K-404)
	11092405	Knob, Off-On/Volume Control, Tone	(9K-405)
	11092406	Knob, AFC	(9K-406)
	11202844	Pointer, Dial A	(SISIN4168A)
	11202845	Pointer, Dial B	(SISIN4168B)
	11213707	Dial	(DIAL-4168)
	11332346	Panel, Speaker	(XDECM4168A)
	11332348	Trim, Cabinet Top	(DEC-M4168B)
	11332349	Panel, Controls	(DEC-M4168C)
	1143260153	Angle, Speaker	(SP-ANG-1)
	11622708	Decoration Cover, Pilot Lamp	(PL-DEC-COV)
	11802709	Handle	(TOTTE-4168)
	11932242	Cover, Battery	(B-BUTA4168)
	1303233500	Printed Circuit Board	(PCB-4168)
	1345273953	Angle, Printed Circuit Board	(XPCB-A4168)
	1330238900	Heat, Sink	(RADIATOR)
	1333206800	Core Holder, Antenna	(CH-68)
	1353276200	Drum, Varicon	(DP-762)
	1353277100	Drum, Band Selector	(DP-771)
	1352273651	Drive Shaft, Tuning	(DS-736)
	1353277200	Drum, Dial Cord Drive,	(DP-772)
	1385270200	Dial Cord	(HARIITO)
	1385550700	Spring, Dial Cord Retaining	(SPRING)
	1530213500	Jack, Earphone	(J-135)
	1533261200	Switch, AFC	(36S-12)
	1531240400	Switch, AC/Battery	(X4S-4)
	1533210900	Switch, Band Selector	(31S-9)
	15332905	Switch, Pilot Lamp	(39S-5)
	1570245000	Speaker	(1309P-22H)
	1571227758	Rod Antenna	(XRODANT277)
	1593250100	Pilot Lamp (6V-30mA)	(3PL-501)
	1590241900	Earphone	(MR-19)
	1393283400	Battery Terminal (+)	(B-TANSI-A)
	1393283500	Battery Terminal (−)	(B-TANSI-B)
	1193226400	Holder, Handle	(TOTTE-HOLD)

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